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MAIN RESEARCH ARTICLE

Induced abortion: a means of postponing childbirth? Changes in maternal age at induced abortion and child birth in Norway during 1971–2007MARIANNE VLIETMAN¹, AASHI AMBAREEN SARFRAZ¹ & ANNE ESKILD^{1,2}

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Abstract

Objective. The maternal age at child birth is increasing. If induced abortion is an important means of postponing childbirth in a population, it is to be expected that in young women the rate of conceived pregnancies is stable over time, but the induced abortion rate is increasing. We studied birth rates, induced abortion rates and the sum of these rates by maternal age during four decades. **Design.** Register-based study. **Setting and population.** All women 15–49 years living in Norway. **Methods.** We present temporal changes in birth rates and induced abortion rates within age groups during the period 1979–2007. We also estimated the sum rate of births and induced abortions. Data were obtained from national statistics. **Main outcome measures.** Live births and induced abortions per 1000 women per year. **Results.** The induced abortion rates have been relatively stable within age groups, except for a decrease in women 15–19 years (from 24.2 in 1979 to 17.0 in 2007) and an increase in women 20–24 years (from 23.2 to 29.5). The birth rates however, have decreased dramatically in women 20–24 years old (from 113.6 to 60.5). Hence, the sum rate of births and induced abortions in women 20–24 years old has decreased from 136.8 to 90.0. In women 30 years old or older, the birth rates have increased. **Conclusion.** The induced abortion rate has been relatively stable in all age groups over time, suggesting a limited influence of induced abortions on the postponement of childbearing.

Key words: Birth rate, induced abortion rate, population study, risk factors

Introduction

Maternal age at delivery is increasing in the Western world (1–3). In Europe, women in Lichtenstein and Spain had the highest mean age at child birth with 31.3 and 30.9 years, respectively, in 2006 (4).

Maternal age at child birth may be determined by socioeconomic factors, sexual behaviors, fertility, use of contraceptives and availability of induced abortions (1,5). Safe contraception is easily accessible (6) and termination of first-trimester pregnancy on the woman's request is legalized and safely performed in health care settings in many European countries (7). To what extent induced abortions at a young age account for the postponement of childbearing? This

question is not easily answered since few countries have reliable figures on age specific induced abortion rates.

In 1971, the mean age of Norwegian first time mothers was 22.5 years, while it was 28.1 years in 2007 (8). Among all childbearing women, the mean age was 30.3 years in 2007 (9). Induced abortion on the woman's request before 12 completed pregnancy weeks has been performed legally in Norway since 1979, and the number of induced abortions per year has been stable (10). Also, in other Nordic countries, the mean maternal age at child birth has increased, whereas the overall abortion rates have remained relatively unchanged (11).

If induced abortion has been used for the postponement of childbirth, it is to be expected that the

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induced abortion rate has increased in younger women, while the sum of induced abortion and birth rates has remained unchanged. In all women 15–49 years living in Norway, we studied changes in age specific birth rates during 1971–2007 and age specific induced abortion rates during 1979–2007.

Materials and methods

All women in Norway who were between 15 and 49 years of age during the period 1971–2007 were included in our study.

The number of live births per 1000 women in different age groups was obtained from the Medical Birth Registry of Norway (10), where the rates were calculated on the basis of the age distribution in the population as obtained by the Population Registry of Norway. This registry includes all individuals with legal stay in Norway and the information on child birth is obtained by compulsory notification of births after 16 weeks of gestation to the Population Registry and to the Medical Birth Registry of Norway.

The number of induced abortions per 1000 women in each age group was obtained from Statistics Norway (12) and was available from 1979. Induced abortions are performed at hospitals only, and the hospitals report their numbers of induced abortions

according to the women's age and county of residence on standardized forms. Such reporting is compulsory by law. In Norway, termination of pregnancy is legally performed on the woman's request up until the end of the 12th week of pregnancy. Thereafter, a legal abortion requires the authorization of a committee composed of two physicians (13). Approximately 4% of induced abortions are performed after the 12th week of pregnancy (14). Norway's current induced abortion law has remained unchanged since 1979.

We present the number of live births per 1000 women in the age groups 15–19, 20–24, 25–29, 30–34, 35–39, 40–44 and 45–49 years old for every year during the period 1971–2007. The number of induced abortions per 1000 women was not available before 1979 and is therefore presented for the period 1979–2007. We also calculated the sum of births and induced abortions per 1000 women in the different age groups.

Results

In the population as a whole, the rates of induced abortions and births have been relatively stable during our study period. The abortion rate has been approximately 14 per 1000 women per year and the birth rate has been 55 per 1000 women per year (Figure 1).

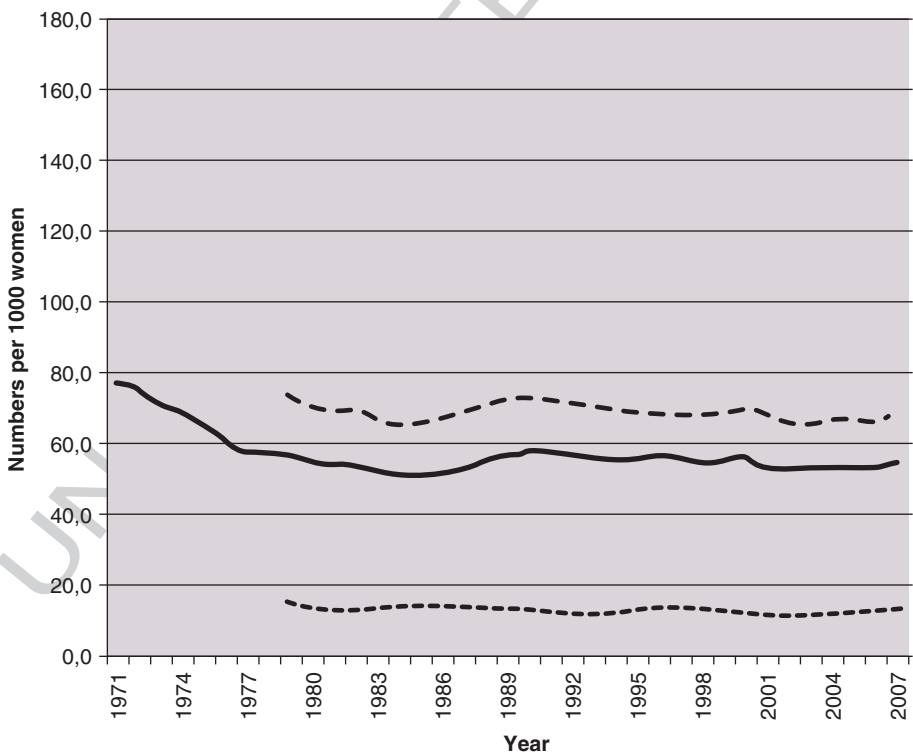


Figure 1. The total number of induced abortions (-----) during 1979–2007 and births (————) during 1971–2007 per 1000 women in Norway. The sum rate of births and induced abortions is presented as a striped line (-----).

In women between 25 and 40 years old, only little variation in the induced abortion rate was observed (Figure 2, Table 1). In women 20–24 years old, however, the rate increased from 23.2 induced abortions per 1000 women in 1979 to 29.5 per 1000 women in 2007. As a contrast, in 15–19 year old women, the induced abortion rate decreased from 24.2 to 17.0 during the same time period. In 40–44 year old women, the overall induced abortion rate was low, and decreased from 7.4 to 4.2 per 1000 women during the period.

The temporal changes in birth rates revealed striking differences between age groups (Figure 2, Table 1). In 15–19 year old women, the birth rate decreased from 45.7 births per 1000 women in 1971 to 9.1 births per 1000 women in 2007. The absolute decrease in birth rate was even more pronounced in women 20–24 years from 168.7 to 60.5 births per 1000 women. In 1979 the birth rate was 113.6, and it decreased steadily to 58.6 in 2005. Opposite trends were seen in women 30–39 years, and the birth rates increased from 62.4 to 123.2 in women 30–34 years old, and from 22.2 to 54.1 in 35–39 year old women. In 25–29 year old women, the birth rate pattern was more complex. In the beginning of the period, the birth rate decreased from 151.5 in 1971 to 120.3 in 1983. Thereafter, the birth rate increased and reached a peak in 1990 with 144.0 births per 1000 women, but has been declining since 1990.

The sum of induced abortion and birth rates decreased in women 20–24 years old from 136.8 per 1000 women in 1979 to 90.0 per 1000 women in 2007. In this age group, terminated pregnancies represent an increasing proportion of all conceived pregnancies from 17% in 1979 to 32% in 2007. Also among the 15–19 year old women, there has been a large decline in the sum of induced abortion and birth rates, but despite a decrease in abortion rates, the proportion of pregnancies that are terminated has increased, from 47% in 1979 to 65% in 2007. An opposite trend was seen among older women. Since the birth rates have increased, and the induced abortion rates have been relatively stable over time, the proportion of conceived pregnancies that are terminated has declined.

Discussion

There has been a major age shift in birth rates across age in Norway during the period 1971 through 2007, with a marked decrease in women less than 25 years old and an increase in women above 30 years. The induced abortion rates, however, have been relatively stable over time, except for a decrease in women

15–19 years old and an increase in women 20–24 years old. The changes in induced abortion rates in women less than 25 years are relatively limited as compared to the almost 70% decline in birth rates. Hence, increased utility of induced abortion to control fertility cannot explain the large decline in birth rates in women less than 25 years. The most likely explanation for this decline is increased use of contraceptives.

Maternal age at delivery has been increasing throughout Europe (3), but the influence of induced abortion on the postponement of child birth has, to our knowledge, not been studied on a national level and over a long period of time. A study in the United States concluded that the birth rates in young women declined as a result of improved access to induced abortion and contraceptives (15). The women's reproductive pattern later in life was not addressed. In many countries, induced abortion is illegal and thereby not reported or the reporting is insufficient for estimates of age specific rates.

In Norway, notification of births to the Medical Birth Registry and induced abortions to Statistics Norway is compulsory by law, and the standard notification forms have remained essentially unchanged during our study period. It is therefore unlikely that systematic errors in reporting according to period or maternal age have occurred. All births and induced abortions take place in public hospitals, and the hospitals are responsible for the reporting. The hospital stay and the treatment are free of charge. Underreporting due to illegal abortions or home births is therefore unlikely.

Our data did not allow for stratified analyses by the mother's country of birth. During our study period, there has been considerable immigration of women from developing countries to Norway, and every fifth child today has a parent who has immigrated. In the beginning of our study period only few mothers were not born in Norway or another Nordic country. In general, non-Western women have higher fertility than Norwegian women, and they also become first time mothers at a younger age (16). The estimated decline in birth rates in young women born in Norway may, therefore, have been even more pronounced than our results indicate since non-Western women are overrepresented in this age group.

Following the decline in birth rates in 20–24 year old women in the beginning of the 1970s, there was an increase in women above 25 years ten years later. This increase was followed by a decline since 1991. Thus, postponement of childbearing, also in 25–29 year old women, may explain the increasing birth rates in women older than 30 years. The overall birth rate in Norway has been stable during our study period. Changes in age specific birth rates cannot be

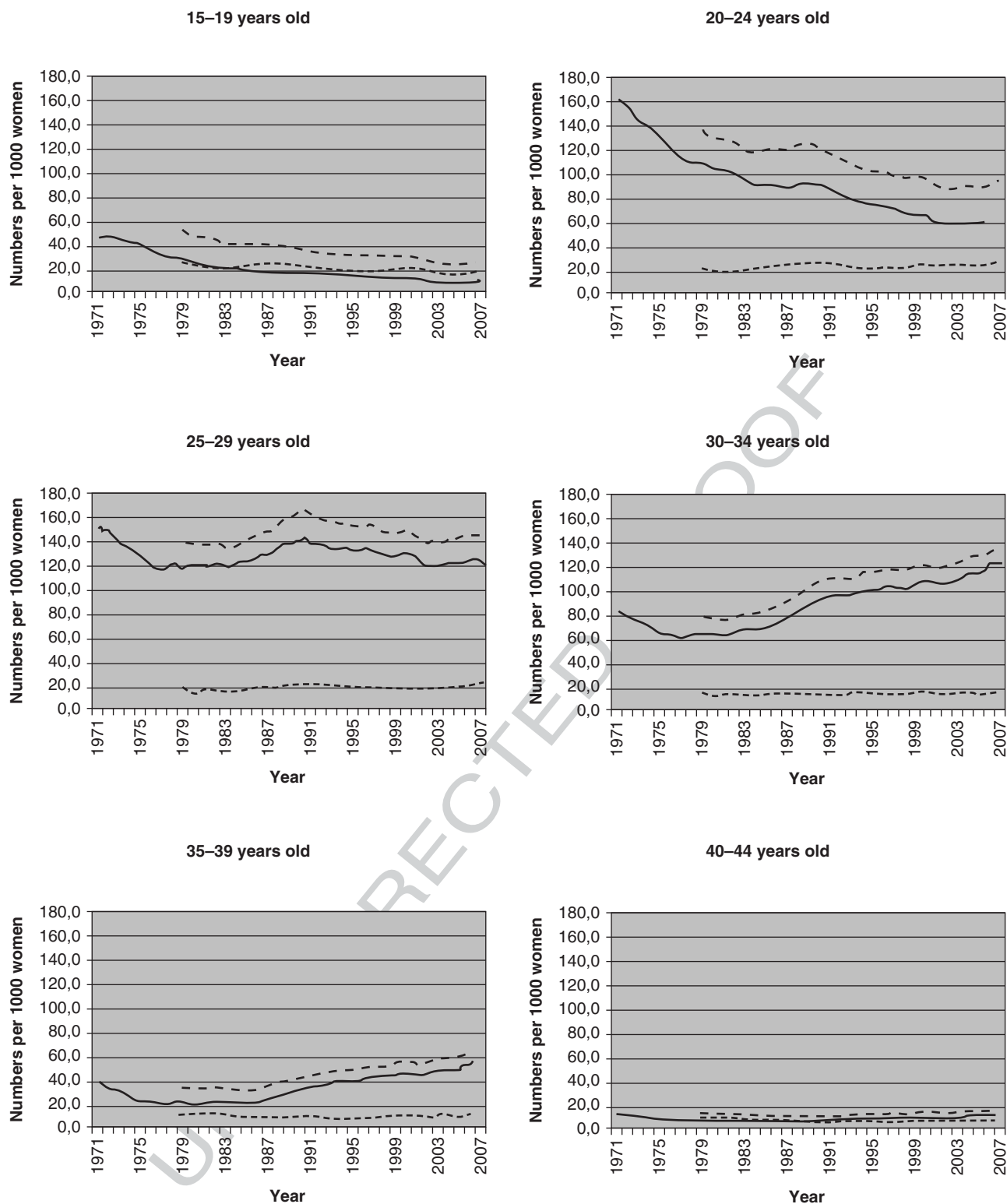


Figure 2. Number of induced abortions (-----) during 1979–2007 and births (————) during 1971–2007 per 1000 women in Norway, according to maternal age. The sum rate of births and induced abortions is presented as a striped line (-----).

Table 1. Number of induced abortions (1979–2007) and births (1971–2007) per 1000 women in Norway according to maternal age. The sum rate of births and induced abortions is also presented for each age group.

Year	15–19 years old			20–24 years old			25–29 years old			30–34 years old			35–39 years old			40–44 years old			45–49 years old		
	Abortions	Births	Sum	Abortions	Births	Sum	Abortions	Births	Sum	Abortions	Births	Sum	Abortions	Births	Sum	Abortions	Births	Sum	Abortions	Births	Sum
1971		45.7			168.7			151.4			84.0			39.4			9.9			0.5	
1972		47.1			160.7			148.7			78.5			34.5			8.7			0.5	
1973		44.3			150.0			139.6			74.8			31.2			7.2			0.4	
1974		42.5			144.8			136.1			69.8			27.3			6.5			0.4	
1975		40.3			134.6			129.2			63.9			24.2			5.3			0.3	
1976		35.7			126.0			120.6			63.0			23.5			5.0			0.3	
1977		32.3			116.0			117.5			60.6			20.9			4.4			0.2	
1978		29.0			113.9			121.8			63.4			22.1			4.5			0.2	
1979	24.2	27.3	51.5		113.6	136.8	18.0	121.1	139.1	15.2	62.4	77.6	12.2	22.2	34.4	7.4	4.0	11.4	1.0	0.2	1.2
1980	22.5	25.2	47.7		108.3	130.4	16.2	122.4	138.6	13.7	62.8	76.5	11.4	21.9	33.3	6.8	4.1	10.9	0.8	0.2	1.0
1981	23.2	23.8	47.0		107.0	128.8	17.1	120.5	137.6	14.1	63.0	77.1	11.3	22.0	33.3	6.3	3.9	10.2	0.9	0.2	1.1
1982	21.0	22.0	43.0		104.7	126.8	15.6	123.0	138.6	13.9	65.8	79.7	11.7	22.4	34.1	6.0	3.8	9.8	0.8	0.3	1.1
1983	20.8	19.7	40.5		97.3	120.4	16.2	120.3	136.5	13.8	67.8	81.6	10.7	22.4	33.1	5.9	3.6	9.5	0.8	0.2	1.0
1984	21.0	19.2	40.2		93.9	118.3	17.0	123.7	140.7	13.7	68.2	81.9	10.7	22.2	32.9	5.5	4.1	9.6	0.6	0.2	0.8
1985	21.7	17.8	39.5		94.0	120.1	18.1	125.5	143.6	13.8	70.9	84.7	10.3	22.7	33.0	4.6	4.2	8.8	0.8	0.2	1.0
1986	23.0	18.2	41.2		93.2	120.7	19.4	129.4	148.8	14.1	74.4	88.5	10.4	22.2	32.6	4.9	4.1	9.0	0.6	0.2	0.8
1987	22.1	17.7	39.8		91.0	120.0	18.3	131.7	150.0	14.2	79.7	93.9	10.1	24.6	34.7	4.6	4.1	8.7	0.5	0.3	0.8
1988	22.5	18.2	40.7		94.3	123.3	20.9	138.6	159.5	14.1	85.1	99.2	9.8	27.7	37.5	4.3	4.6	8.9	0.5	0.2	0.7
1989	21.6	17.7	39.3		94.0	124.2	21.8	140.6	162.4	14.8	91.3	106.1	10.2	29.7	39.9	4.0	4.4	8.4	0.6	0.1	0.7
1990	20.1	17.1	37.2		93.4	122.0	22.0	144.0	166.0	14.3	95.2	109.5	10.0	32.3	42.3	3.6	4.7	8.3	0.5	0.3	0.8
1991	19.0	16.7	35.7		89.7	118.6	22.2	140.3	162.5	15.0	98.3	113.3	9.8	34.3	44.1	3.5	5.1	8.6	0.5	0.2	0.7
1992	18.9	16.0	34.9		85.7	113.4	21.8	137.5	159.3	14.5	98.3	112.8	9.8	35.2	45.0	3.7	5.3	9.0	0.4	0.2	0.6
1993	18.7	15.0	33.7		81.8	108.3	21.2	134.8	156.0	15.2	99.0	114.2	9.7	37.1	46.8	3.7	5.7	9.4	0.4	0.3	0.7
1994	17.7	14.4	32.1		77.9	103.5	20.9	135.7	156.6	15.7	101.6	117.3	9.7	39.1	48.8	3.5	5.8	9.3	0.3	0.2	0.5
1995	18.0	13.5	31.5		77.5	101.4	19.5	134.3	153.8	14.5	103.6	118.1	8.9	40.2	49.1	3.6	6.2	9.8	0.4	0.2	0.6
1996	18.4	13.5	31.9		75.3	100.8	20.4	135.9	156.3	15.1	106.7	121.8	9.2	41.4	50.6	3.2	6.5	9.7	0.4	0.2	0.6
1997	19.0	12.7	31.7		72.6	97.3	19.3	131.6	150.9	14.9	106.3	121.2	9.5	42.8	52.3	3.5	6.9	10.4	0.3	0.2	0.5
1998	18.7	12.4	31.1		68.7	94.5	19.2	128.2	147.4	15.1	105.0	120.1	9.6	43.3	52.9	3.3	6.9	10.2	0.3	0.2	0.5
1999	19.0	11.7	30.7		68.3	94.8	19.6	129.3	148.9	15.6	110.3	125.9	10.2	44.2	54.4	3.8	7.0	10.8	0.2	0.2	0.4
2000	20.1	11.7	31.8		67.3	95.3	20.1	129.3	149.4	15.2	110.5	125.7	10.8	45.7	56.5	3.6	7.3	10.9	0.3	0.2	0.5
2001	18.8	11.0	29.8		62.7	89.0	19.2	123.6	142.8	14.8	107.9	122.7	10.2	45.6	55.8	3.7	7.0	10.7	0.3	0.3	0.6
2002	16.9	10.1	27.0		59.5	86.3	19.1	121.0	140.1	14.4	109.3	123.7	9.8	44.1	53.9	3.6	7.7	11.3	0.3	0.2	0.5
2003	16.4	9.1	25.5		58.9	85.8	19.5	123.6	143.1	15.2	113.2	128.4	10.8	47.5	58.3	4.0	7.7	11.7	0.3	0.3	0.6
2004	15.7	8.2	23.9		59.6	86.9	19.4	123.9	143.3	15.9	117.1	133.0	11.4	49.1	60.5	4.1	7.9	12.0	0.3	0.3	0.6
2005	15.4	8.0	23.4		58.6	86.0	20.5	124.4	144.9	15.1	118.6	133.7	11.0	48.6	59.6	4.0	8.6	12.6	0.3	0.4	0.7
2006	16.3	8.7	25.0		60.3	88.3	20.6	127.2	147.8	15.6	122.8	138.4	11.0	51.9	62.9	4.3	8.9	13.2	0.3	0.4	0.7
2007	17.0	9.1	26.1		60.5	90.0	22.4	122.3	144.7	15.9	123.2	139.1	11.2	54.1	65.3	4.2	9.7	13.9	0.4	0.4	0.8

explained by changes in induced abortion rates since the induced abortion rates have been relatively stable across maternal age.

In our population of young women, the rate of conceived pregnancies has decreased dramatically during 40 years. This decline is likely to be explained by an increased use of contraceptives. The birth control pill became generally available to Norwegian women in 1967 (17), and the use has increased from 19,341 defined daily doses in 1967 to about 214,660 defined daily doses in 2007 (18). Information on the age distribution among users is not available (19). During our study period, there have been large scale public health efforts for prevention of unwanted pregnancies and induced abortions, in particular among young women. During the years 2002–2006, the birth control pills were available for women 15–19 years of age free of charge at the pharmacies prescribed by midwives or public health nurses in addition to doctors (20). In addition, emergency contraceptives have been available without prescription in Norway since 2000 (21). These efforts may have had an impact on induced abortion rates in teenagers (20).

Despite increased utilization of contraceptives and large public efforts to prevent induced abortions, there has been little change in the overall induced abortion rate. The preventive efforts may, however, have influenced the birth rates. The lack of decline in induced abortion rates suggests that a stable proportion of women over time are prone to intercourse without use of contraceptives and to utilize induced abortion for unwanted pregnancy. Risk factors for induced abortion include being under education, being single with no steady partner, no other children, coming from a broken home, little supervision during childhood and adolescence and alcohol abuse among the parents (22–25). The proportion of women with such risk factors may not have declined over time. On the contrary, the proportion of women being under education has increased. Increased length of education is a common explanation for the postponement of childbearing. However, childbearing and rearing may not be easier while being employed than while being a student.

The public maternity welfare program in Norway is generous and includes 10 months of paid parental leave from work now. However, the level of payment during parental leave depends on maternal working force participation and income prior to delivery. Most young women today are either students or tend to have low income, both factors strongly limiting their maternity welfare benefits. The public maternity welfare program, which provides benefits according to income before childbirth, may therefore enhance

delayed childbearing since income often increases by age. During the 1990s, the duration of paid maternity leave increased from four to ten months. It may be speculated that the decrease in birth rates in 25–29 year old women since 1991 is attributed to this change since their private economy while nursing an infant would be much improved by postponing childbearing.

Effective contraceptives and access to safely performed induced abortions have improved women's opportunity to make reproductive choices. Delayed age at child bearing may be advantageous, but is also associated with increased risk of infertility, miscarriage, fetal death and other complications in pregnancy.

Our results show marked changes in age specific birth rates in Norway during 1971–2007 from childbearing in the early 20s to the early 30s. The induced abortion rates have been relatively stable in all age groups over time suggesting a limited influence of induced abortions on the postponement of childbearing.

Declaration of interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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